Assessment stressresistance of various genotypes of Scots pine (*Pinus sylvestris* L.) using biotechnological methods

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Purpose of work – identify the most resistant genotypes of adult trees of Scots pine using biotechnological methods based on the use of callusogenesis.

The experiment was performed on callus cultures of adult trees of Scots pine, selected by N.F. Kuznetsova on the model object «Ostrogozhsk.» For each original tree genotype was taken at least 20 explants. The experiment was conducted in a 3-fold repetitions. The basic nutrient medium is a Murashige and Skoog with half composition of makrosalt. Hormonal software was performed using α-NAA at a concentration of 2 mg / l and 6 BaP – 0.5 mg / l. Carbohydrate supply provides 3% sucrose. Assessment of callusogenesis was performed visually with interval of 5-7 days on the parameters: the rate of initiation of primary callus cultures (day); intensity of of callus formation (points); callusogenesis rate (%); viability cell culture (day) as well as the aging process callus cultures for one culturing cycle (points). Hormonal software was performed using α-NAA (Sigma, USA) at a concentration of 2 mg / l and 6 BaP (Sigma, USA) – 0.5 mg / l. Carbohydrate supply provides 3% sucrose. Assessment was performed visually callusogenesis with an interval of 5-7 days on the following parameters: speed of initiation of primary callus cultures (day); intensity (points) and frequency of callusogenesis (%); viability callus tissue (day) as well as the aging process callus cultures for one culturing cycle (points).

On the basis of the data trees were differentiated into 2 groups: relatively resistant and sensitive. It is shown: one of the most informative parameters that can be used to indication, is the frequency callusogenesis. It should be noted: culture, with high levels of the callusogenesis frequency (relatively stable) characterized by high levels of initiation. Conversely, cultures with low callusogenesis frequency (relatively sensitive) had a first reaction to 10-15 days, which is 2-3 times slower resistant.

During the analysis process callusogenesis on the «growth rate» of tissue we were able to identify the most informative phase of cultivation: initial and final.

Differences between groups resistant and sensitive trees are installed and callus tissue viability: the starting date of necrotic tissue vary widely – from 5 to 30 days. Dates spread necrosis also vary – from 5 to 25 days. It is found: lifetime of callus belonging to groups resistant trees is 2-3 times more than sensitive. There is a connection between the parameters of the frequency callusogenesis and visual manifestation of its aging. Typically, the culture with high parameters of callusogenesis frequency different more vitality.

The data talk about high indicates ability of pine indicator callusogenesis and possibility of using this method in order to select the most resistant genotypes.

Key words: *Scots pine, callus, stress resistance, intensity of callusogenesis, frequency of callusogenesis, callus viability*